field to the reed switches using a small magnetic element **18** fixed immediately adjacent the reed switch on the printer. This small magnetic element **18** biases the reed switch in a predetermined position. The predetermined position is dependent upon the initial position of the reed switch in the absence of the magnetic field as well as the polarity of the small fixed magnetic element.

If a larger opposing magnetic element **20** is brought in proximity with the biased reed switch **10** (see FIG. **3**), the two magnetic elements **18,20** if selected properly and spaced in relation to their respective magnetic fields can counteract each other and return the switch to its unbiased position. That is, the larger magnetic element can return the magnetic switch back to the default position the switch would assume if no external magnetic fields are present.

In a preferred system of FIG. **4**, the printer represented by plane **22** includes a pair of reed switches **10***a*, **10***b* adjacent to the location where the cartridge (not shown) resides. Prior to the introduction of magnetic elements C and D, one of the reed switches preferably occupies a normally closed ("NC") position and the other reed switch occupies a normally open ("NO") lead. The respective positions can be easily achieved by including a pair of fixed magnets immediately adjacent the reed switches, one magnet having a "north" polarity exerting a magnetic field on its corresponding reed switch and a second magnet having a "south" polarity exerting a magnetic field on its corresponding reed switch. In this configuration, if a cartridge is inserted into the printer with no magnetic elements to counterbalance the existing fixed magnets, the reed switches will not deviate from their normal, biased position. This condition indicates to the printer that a non-recognized cartridge has been inserted into the printer.

In a preferred system of FIG. **4**, the printer represented by plane **22** includes a pair of reed switches **10***a*, **10***b* adjacent to the location where the cartridge (not shown) resides. Prior to the introduction of magnetic elements C and D, one of the reed switches preferably occupies a normally closed ("NC") position and the other reed switch occupies a normally open ("NO") lead. The respective positions can be easily achieved by including a pair of fixed magnets, A and B, immediately adjacent the reed switches, one magnet having a "north" polarity exerting a magnetic field on its corresponding reed switch. In this configuration, if a cartridge is inserted into the printer with no magnetic elements to counterbalance the existing fixed magnets (A and B), the reed switches will not deviate from their normal, biased positions. This condition indicates to the printer that a non-recognized cartridge has been inserted into the printer.

However, if the cartridge includes a pair of magnets as shown in FIG. **4** having opposed polarities to those of the fixed magnetic elements and of a size to compensate for the increased distance between the fixed magnetic elements and the magnets on the printer cartridge, both reed switches will default to their unbiased positions, indicating to the printer a successful cartridge recognition. In this case, the printer can reset the print setting to optimize the settings for the recognized printer cartridge. By increasing the "bits," i.e., switch/magnet combinations, a code can be developed for a plurality of cartridge types, such as cartridge families and specific models within a particular cartridge family.

The printer cartridge can be equipped readily with a complimentary magnetic couple to the fixed magnets, as shown in FIG. **5**. The embodiment shown in FIG. **5** includes two magnets **26** separated by a non-magnetic spacer **28**. An adhesive flap **30** is included to mount the complimentary circuit component to the printer cartridge adjacent the reed switches **10** of the printer **22**. Further, the size of the magnets **26** and the distance effected by the spacer **28** are selected to introduce the desired magnetic field in order to trigger the reed switches **10** on the printer. The size of the magnets **26** are a function of the distance between the magnets on the complimentary circuit component of the cartridge and the reed switches when the cartridge is installed. Separating the magnets **26** by a short distance will increase the field strength about the magnets as compared to having the magnets **26** in contact with each other, but too great a separation isolates the strength of the individual magnets negating the combined effect. By knowing the distance that the complimentary magnetic circuit lies from the reed switches when the cartridge is inserted into the printer allows for a determination of the proper magnet size and strength.

Additionally, if a specified cartridge is identified as being of a non-authorized type (or conversely not identified as an authorized type), the printer can determine how many copies are made with the non-authorized cartridge for warranty and repair purposes. If a non-recognized cartridge is detected by the system, the printer may reset to default settings that are not optimized, but are more readily operational to a variety of cartridge types. Every copy made with a non-recognized cartridge can be counted and stored for later use in diagnostic evaluations.

Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiment can be configured without departing from the scope and spirit of the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

What is claimed is:

1. A printer cartridge comprising a series of magnetic elements selected to counterbalance a series of magnetic elements on a printer, and each positioned to lie adjacent to a corresponding magnetic field detecting switch on the printer, where the position of the magnetic elements on the cartridge are located so as to change a condition of the corresponding magnetic field detecting switch when the cartridge is inserted into the printer.

2. The printer cartridge of claim **1** wherein the magnetic field detecting switch comprises a reed switch.

3. The printer cartridge of claim **1** wherein each magnetic field detecting switch comprises an element of a cartridge identification code.

4. A printer cartridge identification system comprising:

a printer cartridge having a plurality of magnetic elements disposed opposite a plurality of magnetic field detecting switches located on a printer; and,

a printer having the plurality of magnetic field detecting switches corresponding to the plurality of magnetic elements on the printer cartridge and a plurality of fixed magnetic elements adjacent the plurality of magnetic field detecting switches, each fixed magnetic element biasing one of the magnetic field detecting switches to a first position; and,

where the magnetic field detecting switches cooperate to define a printer cartridge identification code.

5. The printer cartridge identification system of claim **4** wherein the magnetic elements on the printer cartridge are of a size and strength to counterbalance the fixed magnetic elements on the printer when the cartridge is located in the printer.

6. A printer cartridge identifying printer comprising:

a magnetic field detecting switch adjacent a printer cartridge port and adapted to switch from a first position to a second position when a magnet on the printer cartridge is brought in proximity with the magnetic field detecting switch;

circuitry on the printer for evaluating the position of the magnetic field detecting switch and determining whether the cartridge in the printer is of a specific type; and,

a fixed magnetic element adjacent the magnetic field detecting switch to bias the magnetic field detecting switch to a predetermined position.

7. A printer cartridge identification system comprising:

a printer comprising a plurality of magnetic field detecting switches adjacent to a plurality of fixed magnetic elements on the printer; each fixed magnetic element having a magnetic field of a predetermined polarity and each magnetic field detecting switch having a first biased position and a neutral position; and,

a printer cartridge having a plurality of magnetic elements; each magnetic element having a magnetic field of identical polarity to a corresponding fixed magnetic element on the printer, whereby the magnetic field of the magnetic element on the printer cartridge interacts with the magnetic field of its corresponding fixed magnetic element on the printer to allow return of the adjacent magnetic field detecting switch to the neutral position from the first biased position.

8. The printer cartridge identification system of claim 7 where a combination of magnetic field detecting switches define a printer cartridge identification code.

9. The printer cartridge identification system of claim 8 where the printer further comprises circuitry for evaluating the printer cartridge identification code by reading the position of each magnetic field detecting switch.

10. The printer cartridge identification system of claim 7 where the magnetic field detecting switches comprise reed switches.

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